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ACADEMIC EXPERIENCE

Assistant Professor, IIT (ISM) Dhanbad. Since April 2025.

***Research Interests*: Synthesis of Phospholipids and their role as a microreactors, small and mRNA drug carriers and Lipid Oxidation, Synthesis of antioxidants, Chemical Origins of Life.**

Description: My current research area of interests are synthesis and biophysical studies of phospholipids and their role in chemical evolution. Phosphatidyl Serine (PS) is a phospholipid present in plasma membranes of eukaryotic cells and in other organelle membranes. PS lipids play an important role in biology such as cell signaling, cognitive function, membrane stability and fertilization. Mixing of PS lipids with other phospholipids or glycerolipids has shown great potential therapeutic applications. Phosphatidyl threonine (PT), a structural analog of PS found in animal tissues and bacteria. PS liposomes are broadly used as a drug carrier in medicinal chemistry, but the role of phosphatidyl threonine (PT) liposomes as a drug carrier has not been studied well. Therefore, I propose to study the role of PS and PT and its modified lipids in membrane dynamics and in drug encapsulated liposomes that would help to understand the flip-flop behavior of PSs and PTs and drug efficiency.

RESEARCH EXPERIENCE

NASA Post-doctoral Fellow, The Scripps Research Institute (TSRI), La Jolla, California, US. March 2023-Feb 2025.

***Research topic:* Studying the feasibility of metabolic reactions by the lipid compartmentalization**

Post-doctoral Fellow, The Scripps Research Institute (TSRI), La Jolla, California, US. March 2020-Feb 2023.

***Area of research:* Evaluation and Biophysical study of Phospholipid Liposomes and Protometabolism towards the origins of life.**

Description: I focus on research to develop synthetic protocells and carry out metabolic reactions to understand the biophysical basis of evolutionary mechanisms. In this research, I prepared phospholipid-based protocells and used Krebs cycle reaction to investigate the dynamism between the metabolic pathways and protocell behavior. I purify these synthetic

protocells by size-exclusion chromatography and characterize them by liquid chromatography-mass spectrometry (LC-MS), and nuclear magnetic resonance (NMR) spectroscopy. I studied the behavior of the protocells using the confocal fluorescence microscopy (CFM). The Krebs cycle reactions will be conducted within these protocells and will be followed by enzymatic assays. My research aims to understand the physical principles of how living cells can emerge by applying the combined knowledge of biophysics and chemistry. This information can be used to fashion synthetic protocells that are capable of harnessing energy and synthesis of small drug like molecules inside the protocells for drug-delivery).

Acadamic Qualifications

Ph.D. in Chemistry, Indian Institute of Technology Bombay (IITB), India. January, 2014 to January 2020.

Title: A Metathetic Approach towards the Synthesis of Polycycles and Heterocycles.

During my Ph.D, I have developed synthetic methodologies to assemble small organic molecules to natural product core structures, which are useful in natural product synthesis and biomedical applications. This work explored novel methodologies to synthesize various propellanes, aza-tricyclic compounds, and pentacyclic compounds using olefin metathesis as a key methodology.

Ph.D. Course work: 2013 Spring- 2014 Spring (**CGPA: 8.28)**

M. Sc in Organic Chemistry, Andhra University, Visakhapatnam, India (**CGPA 7.25**).

B. Sc in Chemistry, Andhra University, Visakhapatnam, India (**72.5%**).

Intermediate (Maths, Physics, Chemistry). Chaitanya Jr. College, S. Kota, India (**81.6%**)

S.S.C. (10th). Govt. High School, S. Kota, AP, India (**67.33%**).

TEACHING & REVIEWING EXPERIENCE

- ❖ Reviewed ACS Earth and Space Chemistry and JACS journals.
- ❖ Worked as a panelist for NASA's PLANET21 to review the graduate research proposals
- ❖ Participated as a teacher for the SMILE (Scripps Research's Scientists Making Impacts in Learning Environments) program for K-8 students.
- ❖ Worked as a Teaching Assistant, Undergraduate Courses (CH–117L) at Indian Institute of Technology Bombay, India, **2015–2016.**

LIST OF PUBLICATIONS

- Abiotic Aldol Reactions of Formaldehyde with Ketoses and Aldoses – Implications for the Prebiotic Synthesis of Sugars by the Formose Reaction. Sutton, S.S.; Pulletikurti, S.; Lin, H.; Krishnamurthy, R.*; Liotta, Ch. L.* *CHEM*, 2025, doi: 10.1016/j.chempr.2025.102553.
- Protocol for Preparing Cyclic-Phospholipid Decanoate and Glyceryl-didecanoate-phosphate Containing Vesicles. Kollery, V. S.; Pulletikurti, S.; Deniz, A. A.; Krishnamurthy, R.* *Star Protocols*, **2024**, *5*, 103283.
- Experimentally Modelling the Emergence of Prebiotically Plausible Phospholipid vesicles. **Pulletikurti, S.;** § Kollery, V. S.; § Yadav, M.; Deniz, A. A.; Krishnamurthy, R.* *CHEM*, **2024,** 10, 1839-1867. doi: 10.1016/j.chempr.2024.02.007 (§Authors contributed equally; *Corresponding author).
- Synthesis and Hydrolytic Stability of Cyclic Phosphatidic Acids: Implications for Synthetic- and Proto-cell Studies. Egas, V. O; **Pulletikurti, S;** Kollery, V. S.; Krishnamurthy R.*. *Chem. Commun.* **2022**, *58*, 6231.
- Prebiotic Synthesis of α-Amino Acids and Orotate from α-Ketoacids Potentiates Transition to Extant Metabolic Pathways. **S. Pulletikurti**§, M. Yadav§, R. Krishnamurthy*. *Nat. Chem.* **2022**, *14*, 1142. (§Authors contributed equally; *Corresponding author).
- Cyanide as a Primordial Reductant enables a Protometabolic Reductive Glyoxylate Pathway. M. Yadav§, **S. Pulletikurti**§, J. R. Yerabolu, R. Krishnamurthy*. *Nat. Chem.* **2022**, *14*, 170. (§Authors contributed equally; *Corresponding author)
- Synthesis of Polycycles and Oxacycles by Tandem Metathesis of endo–norbornene Derivatives. S. Kotha*, **S. Pulletikurti,** Fatma, A., Dhangar, G., and Naidu, G. S. *Synthesis* **2021**, *53*, 1931. (*Corresponding author)
- Synthetic approach to oxa-triquinanes via olefin metathesis as a key step. S. Kotha* and **S. Pulletikurti.** *Indian J. Chem. Sect. B* **2020**, *59*, 1868. (*Corresponding author)
- Synthesis of spiro-annulated cyclobutane derivatives through ketene [2+2] cycloaddition and ring-rearrangement metathesis. S. Kotha* and **S. Pulletikurti** *Indian J. Chem. Sect. B* **2020**, *59*, 1875. http://nopr.niscair.res.in/handle/123456789/55774. (*Corresponding author)
- Lewis acid-mediated synthesis of indalozidine derivatives. S. Kotha* and **S. Pulletikurti** *Heterocycles*, **2020**, *101*, 717. (*Corresponding author)
- A metathetic approach to [5/5/6] aza-tricyclic core of dendrobine, kopsanone and lycopalhine A type of alkaloids. S. Kotha* and **S. Pulletikurti** *Synthesis* **2019**, *51*, 3981. (*Corresponding author)

- Ring-opening metathesis of *N*-alkenyl β-lactams. S. Kotha*, **S. Pulletikurti** and Y. Dommaraju *Heterocycles.* **2019**, *98*, 79. (*Corresponding author)
- Synthesis of propellanes containing a bicyclo[2.2.2]octene unit via the Diels–Alder reaction and ring-closing metathesis as key steps. S. Kotha* and **S. Pulletikurti** *RSC Adv.*, **2018**, *8*, 14906. (*Corresponding author).

Industry Experience

- Worked as Senior Chemist in Research & Development, Mylan Laboratories Pvt Ltd from **July 2012- Dec 2013**.

Conferences and Invited Lectures

- Presented an invited talk on "Heterogenous Protocells: Physical Properties and Compartmentalization" at AbSciCon24, held on May 2024 in Providence, USA.
- Presented an invited talk on "A Natural Emergence of Phospholipids: Heterogeneous Protocells and Compartmentalization" at IIT Tirupathi on Feb 2024.
- Presented an oral talk on "Role of carbonyl group at C7 position of *endo*-norbornene derivatives on olefin metathesis: A key to synthesis a class of tricyclic cores of natural products" at In-House Symposium, IIT Bombay-2019.
- Presented a Poster entitled "A metathetic approach to [5/5/6] tricyclic core of dendrobine, kopsanone and lycopalhine A type of alkaloids" at International Symposium on Olefin Metathesis (ISOM), Barcelona, Spain-2019.
- Presented a Poster entitled "A metathetic approach to [5/5/6] tricyclic core of dendrobine, kopsanone and lycopalhine A type of alkaloids" at ACS on campus, IIT Bombay 2019.
- Presented a Poster entitled "A metathetic approach to [5/5/6] tricyclic core of dendrobine, kopsanone and lycopalhine A type of alkaloids" at JNOST, IICT-Hyderabad, 2018.
- Presented a Poster entitled "Synthesis of propellanes containing bicyclo[2.2.2]octene unit via the Diels–Alder reaction and ring-closing metathesis as key steps" at In-House Symposium, IIT Bombay 2018.

Technical Skills

- Expertized in operating Bruker 400-600 1D, 2D-NMR and quantitative NMR spectroscopy.
- Expertized in operating Confocal Microscopy LSM 710, 780 & 880
- Expertized in operating UV-Vis Spectrophotometer, Spectrofluorometer and FT-IR
- Familiar with operating Dynamic Light Scattering (DLS) and it's analysis.
- Operated Bruker Mass maxis impact 282001.00081, and LCMS

- Familiar with conventional chromatographic techniques such as HPLC, GCMS, and Flash column chromatography.
- *Synthesis and characterization of biomolecules, and phospholipids*
- *Purification and characterization of liposomes and liposomes containing small and macromolecules.*

Awards

- Awarded NASA Postdoctoral Fellowship (NPP) sponsored by NASA, USA in March 2023.
- Awarded *Senior Research Fellowship* (SRF) sponsored by University Grants Commission (UGC), India, **2016**
- Awarded *Junior Research Fellowship* sponsored by University Grants Commission (UGC), India, **2013**
- Awarded Lectureship sponsored by CSIR-UGC, India, **2012**
- Qualified *Graduate Aptitude Test in Engineering* (GATE), India, **2012**

Responsibilities

- Technical manager of Team Zero Waste, IIT Bombay.
- Member of Sustainability Cell, IIT Bombay.
- Departmental coordinator, Institute Research Scholars Campanian Program (IRSCP)
- Participated in Teaching for School and college students at Abhyasika, A student initiative of IITB students of unprivileged kids.

References

1. **Prof. Ram Krishnamurthy**
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   The Scripps Research Institute,
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2. **Prof. Kotha Sambasivarao**
   Department of Chemistry
   IIT Bombay, Mumbai
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3. **Prof. Ashok Deniz**
   Department of Integrative Structural and Computational Biology
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